

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
12 July 2007 (12.07.2007)

PCT

(10) International Publication Number
WO 2007/078721 A3

- (51) International Patent Classification:
G01R 31/28 (2006.01)
- (21) International Application Number:
PCT/US2006/047351
- (22) International Filing Date:
12 December 2006 (12.12.2006)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
11/323,557 30 December 2005 (30.12.2005) US
- (71) Applicant (for all designated States except US): TER-ADYNE, INC. [US/US]; 321 HARRISON AVENUE, Boston, MA 02118 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): BOSY, Brain, J. [US/US]; 11 Garvey Road, Framingham, MA 01701 (US). DIPALO, Craig, A. [US/US]; 10 Hillcrest Drive, Acton, MA 01720 (US). MANN, Seth, E. [US/US]; 61 Summer Avenue, Reading, MA 01867 (US). LEWINNEK, David, W. [US/US]; 41 Cameron Avenue, Somerville, MA 02144 (US). CHIU, Michael, A. [US/US]; 17 Kidder Avenue, Somerville, MA 02144 (US).

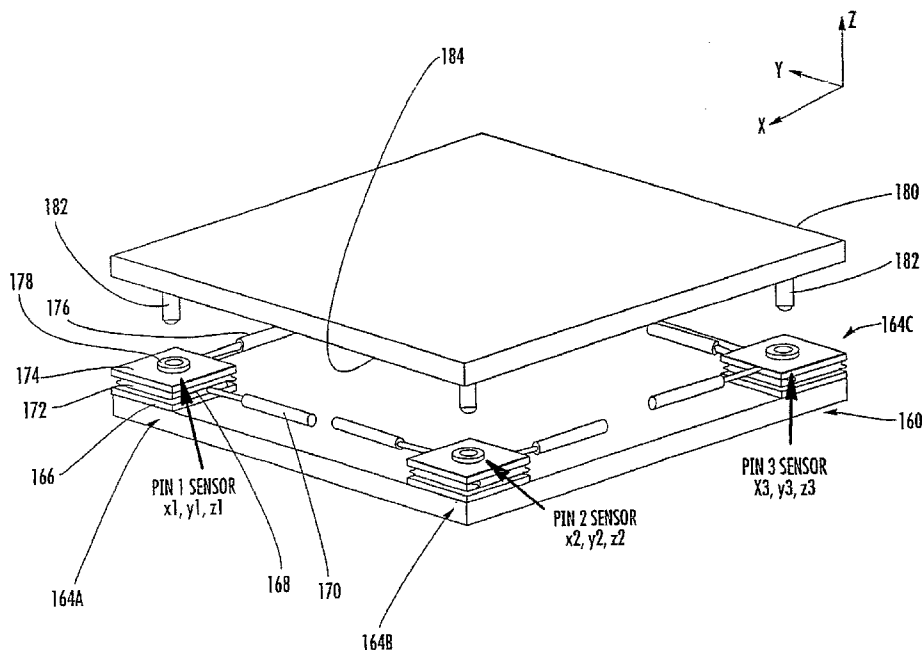
- (74) Agents: RIKKERS, David, J. et al.; Foley & Lardner LLP, 111 Huntington Avenue, Boston, MA 02199 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report

(88) Date of publication of the international search report:
30 August 2007

[Continued on next page]

(54) Title: TEST EQUIPMENT POSITIONAL CONTROL MANIPULATOR



(57) Abstract: An apparatus and method are provided for the automatic operation of a manipulator to move a test head (160) or peripheral (180) into position for proper alignment and docking of the test head with the peripheral. Examples of peripherals include a handler and a prober. Sensors (164) are provided to obtain relative positional information of the test head in the relation to the peripheral, allowing a controller to issue instructions to the manipulator to correct differences in each of the six degrees of freedom between the mating surfaces of the test head and the manipulator.

WO 2007/078721 A3



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/047351A. CLASSIFICATION OF SUBJECT MATTER
INV. G01R31/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G01R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 03/008984 A (INTEST IP CORP [US]; GUDIN NAUM [US]; WEST CHRISTOPHER L [US]; WEILERS) 30 January 2003 (2003-01-30) figures 1A-12 page 1, line 2 - line 23 page 4, line 5 - line 22 page 5, line 30 - page 6, line 10 page 9, line 31 - page 10, line 2 page 11, line 1 - line 17 page 13, line 22 - page 21, line 19 page 25, line 21 - page 27, line 18	1-20
X	US 6 057 695 A (HOLT ALYN R [US] ET AL) 2 May 2000 (2000-05-02) figures 1,9-12,14,31a-35 column 3, line 20 - column 5, line 17 column 11, line 1 - line 64 column 14, line 28 - column 18, line 49 ----- -/--	1-20

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

7 June 2007

Date of mailing of the international search report

13/06/2007

Name and mailing address of the ISA/
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Höllner, Helmut

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/047351

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>WO 02/25292 A2 (INTEST IP CORP [US]; NY NIL O [US]; AKOUKA HENRI M [US]; HOLT ALYN R []) 28 March 2002 (2002-03-28) figures 1(a),2(a),5(a),9(a),9(b),11-14 page 2, line 22 - line 30 page 8, line 26 - page 9, line 25 page 16, line 1 - page 17, line 10 page 41, line 31 - page 42, line 13 page 45, line 7 - line 11 page 46, line 10 - page 47, line 5 page 59, line 6 - line 23 page 61, line 14 - page 65, line 14</p>	1,6-16, 19,20
X	<p>US 2004/140794 A1 (BACK SEUNG-GOOK [KR]) 22 July 2004 (2004-07-22) figures 1-4 paragraph [0013] - paragraph [0018]</p>	1,11,20
X	<p>US 5 321 453 A (MORI SHIGEOKI [JP] ET AL) 14 June 1994 (1994-06-14) figures 1-4 column 3, line 10 - column 5, line 13</p>	1,5,11, 20
A	<p>US 5 861 759 A (BIALOBRODSKI MARIAN R [US] ET AL) 19 January 1999 (1999-01-19) figures 1-3 column 2, line 49 - column 4, line 62</p>	1-20
A	<p>US 2003/201764 A1 (JAFARI NASSER ALI [US] ET AL) 30 October 2003 (2003-10-30) figures 1A,2-6 paragraphs [0003], [0007] paragraph [0025] - paragraph [0027]</p>	1-20
A	<p>US 5 172 053 A (ITOYAMA TAKETOSHI [JP]) 15 December 1992 (1992-12-15) figures 5,16,17 claim 1</p>	1-20

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2006/047351

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 03008984	A	30-01-2003	AU 2002355083 A1 CN 1539083 A EP 1410048 A2 HK 1068954 A1 JP 2004536311 T TW 223074 B	03-03-2003 20-10-2004 21-04-2004 19-01-2007 02-12-2004 01-11-2004
US 6057695	A	02-05-2000	NONE	
WO 0225292	A2	28-03-2002	AT 338952 T AU 9117101 A CN 1484767 A DE 06014164 T1 DE 60122911 T2 EP 1322965 A2 JP 2004523729 T TW 515893 B	15-09-2006 02-04-2002 24-03-2004 06-06-2007 22-02-2007 02-07-2003 05-08-2004 01-01-2003
US 2004140794	A1	22-07-2004	JP 2003264209 A KR 20030060221 A TW 226933 B	19-09-2003 16-07-2003 21-01-2005
US 5321453	A	14-06-1994	NONE	
US 5861759	A	19-01-1999	NONE	
US 2003201764	A1	30-10-2003	JP 2003324133 A	14-11-2003
US 5172053	A	15-12-1992	NONE	